Supplemental Document

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Automated instrument-tracking for 4D video-rate imaging of ophthalmic surgical maneuvers: supplement

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Supplement 1

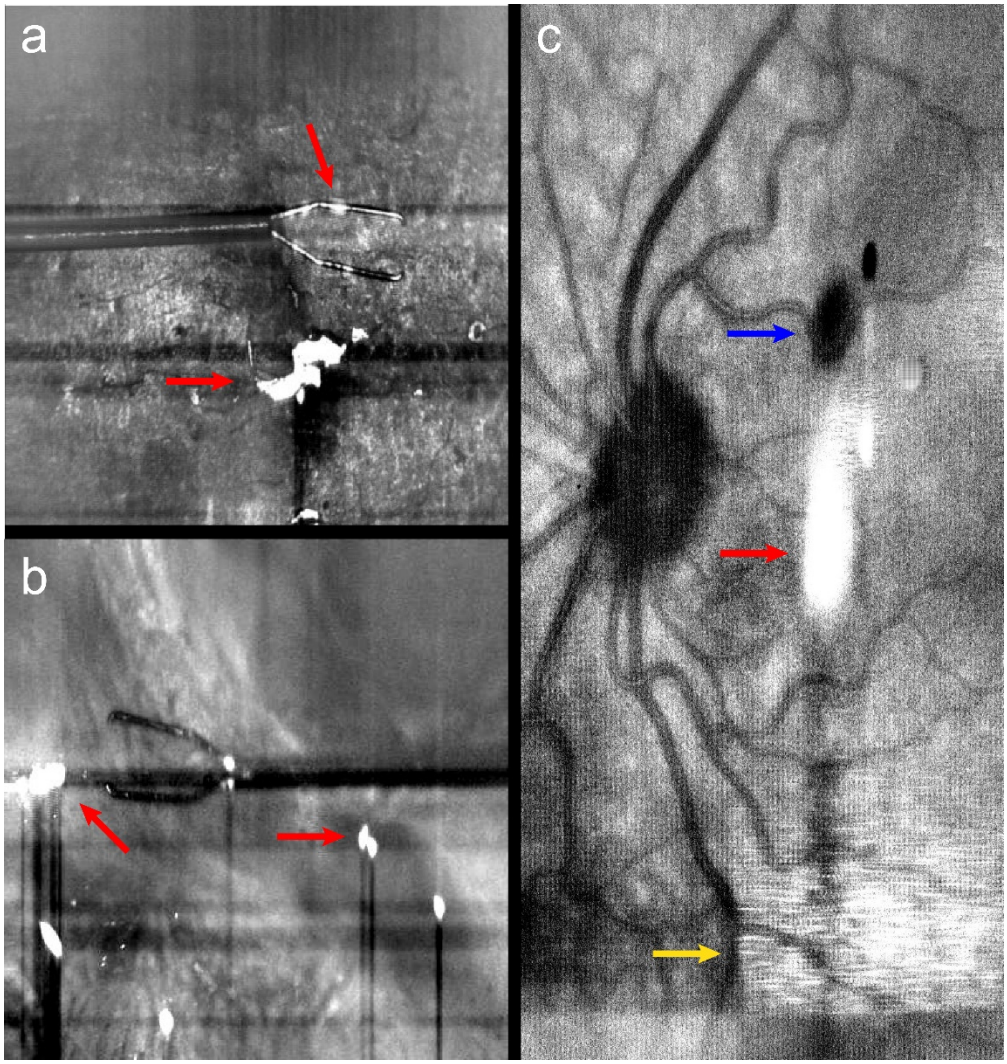

Fig. 1. SER images acquired in a (a) paper sample (b) *ex vivo* bovine eye and (c) *in vivo* human eye showing imaging artifacts such as specular reflections and shadowing due to saturation (red), DC artifacts (blue), and cornea tear film reflections (yellow). See Visualization 1.

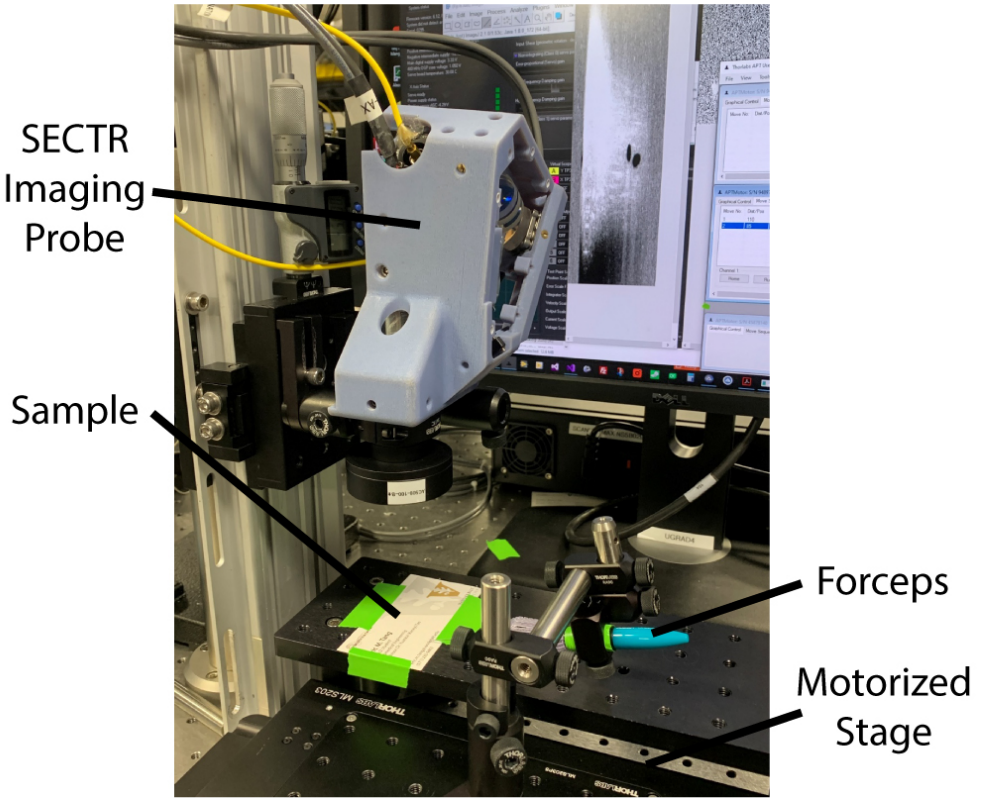

Fig. 2. Experimental setup. The SECTR imaging probe was placed in a microscope configuration over a paper sample. A pair of forceps were mounted to a motorized XY translation stage for fine control of instrument position and speed.

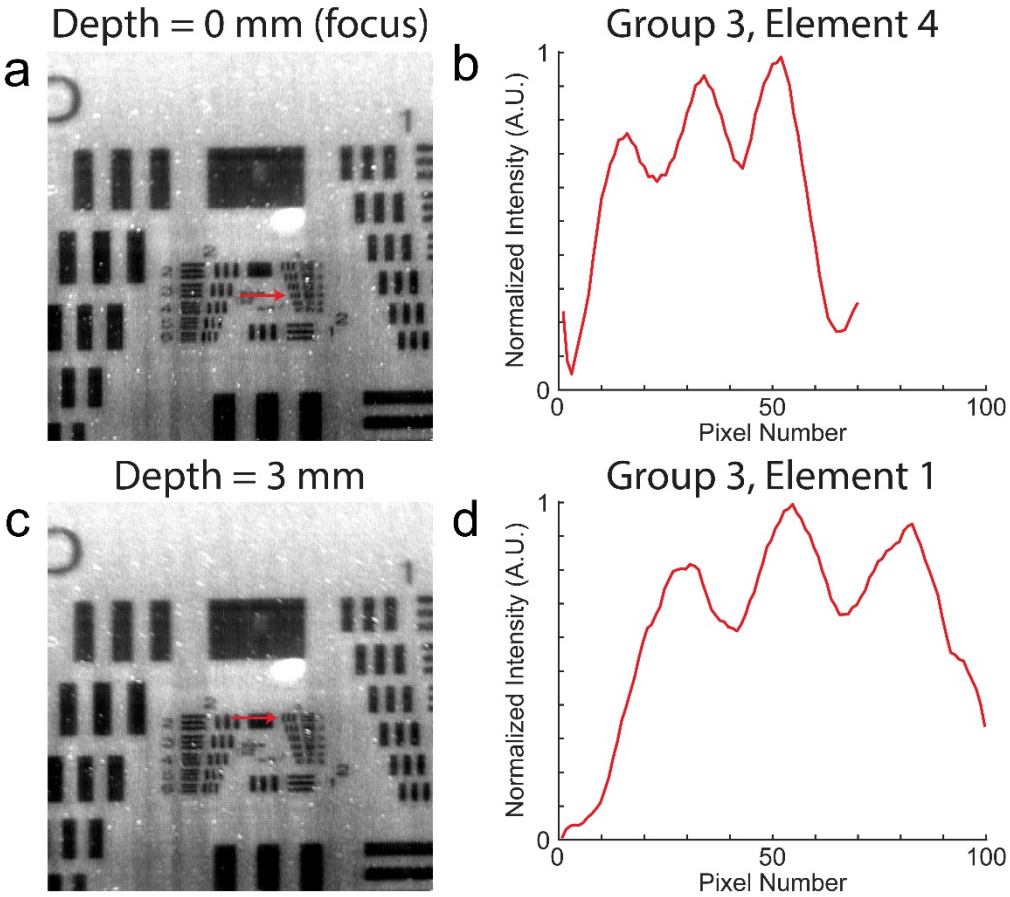

Fig. 3. SER Rayleigh range measurement. (a), (b) At the optimal focal position of the probe, the minimum resolvable feature of the 1951 USAF test chart is Group 3, Element 4 (44.209 μm). (c), (d) At a depth of 3 mm, the minimum resolvable feature is Group 3, Element 1 (62.500 μm).

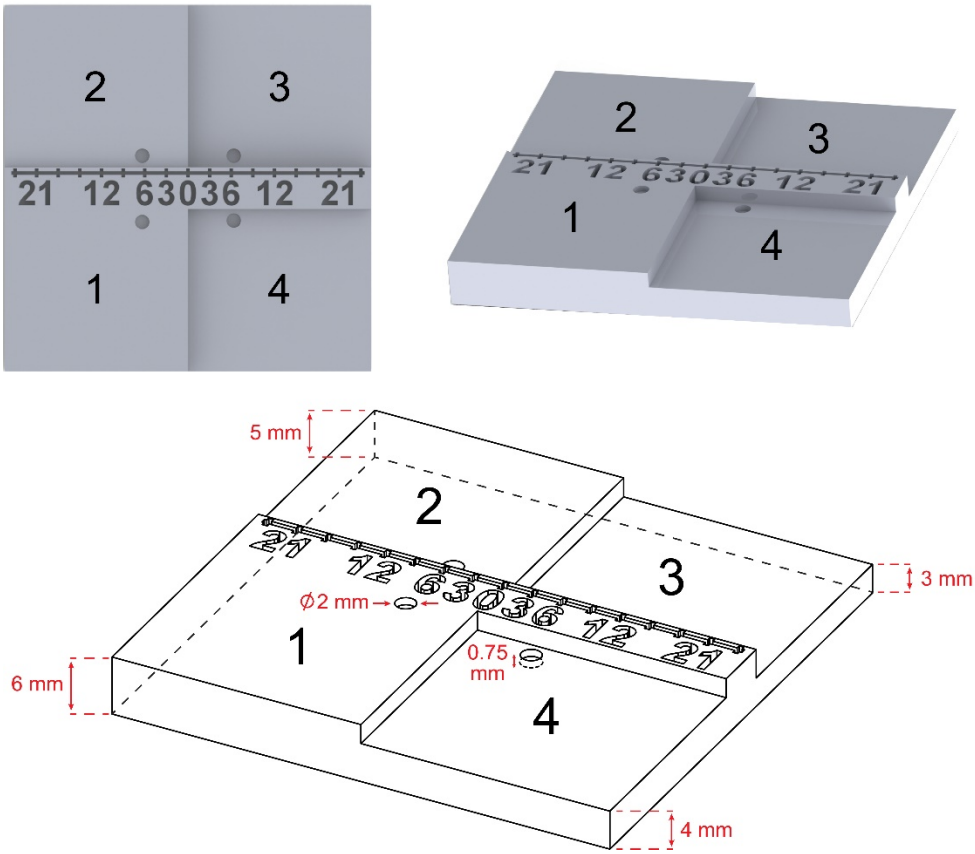

Fig. 4. SolidWorks model of the 4-quadrant phantom used for tracking. Quadrant 1 was placed in the shared focus of SER and OCT. Quadrants 2, 3, and 4 had heights of -1, -3, and -2 mm relative to the focus, respectively. The scale bar with 3 mm increments was included to visualize lateral movement of the instrument across the phantom.